AMERICAN PRINTING HOUSE
FOR THE BLIND, INC.

## Department of Educational and Technical Research

# REPORT OF RESEARCH AND DEVELOPMENT ACTIVITIES

## Fiscal 1997

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## Mission

**The American Printing House for the Blind promotes independence of blind persons by providing special media, tools, and materials needed for education and life.**

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## Introduction

Chartered by the Commonwealth of Kentucky in 1858, the American Printing House for the Blind (APH), located in Louisville, Kentucky, is the oldest publishing house for the blind in the United States (U.S.) and by far the largest publishing house in the world of special materials for individuals who are blind or visually impaired. Since 1879, APH has been, by an act of Congress, the official source of educational texts and aids for use by legally blind students in programs of less than college level throughout the U.S. and its possessions. Ex officio trustees, representing all educational and rehabilitation programs benefiting from this act, help administer the program. APH maintains ongoing educational and technical research programs and provides an on-line national database of educational materials in formats accessible to visually impaired persons.

APH has had an ongoing research program for 45 years. Initial impetus for APH to establish a research program was from the Committee on Research of the American Association of Instructors of the Blind in recognition of the need for an effective and stabilized attack on the research problems of the field. APH's Board of Trustees approved such a program at APH's Annual Meeting held in the fall of 1951. The following spring a Research Committee was convened. The purpose of the Committee was to investigate and recommend projects in the field of educational research to be undertaken by the staff. Marjorie Hooper was appointed to direct the initial work. Her first assignment was to attend regional conferences and visit schools for the blind to meet informally with classroom teachers to learn from them the problems which seemed most pressing and which appeared to require outside help for solution.

The resulting research program carried on at APH is unique in the field of education. Although the types of research activities undertaken are similar to some of those conducted at colleges and universities, there are a number of decided advantages in having the work done through the Printing House. For example, APH serves the nation as a primary source of educational materials for legally blind students. This means that communication channels are always open between APH's staff and the ultimate consumers of its products and services. Because of this, it is possible to identify specific areas of need. And, because of this, it is possible to use the ultimate consumers, both teachers and the students themselves, in the development and evaluation of needed tools and materials.

Other direct advantages in having a research program based at APH are (a) there is a tremendous amount of expertise both under the same roof and in the community which is always available for consultation, (b) because of APH's many faceted manufacturing capabilities, it is possible to produce and use a wide array of experimental materials, (c) in preparing materials for developmental projects, experimental materials can be developed in close collaboration with production personnel, thus assuring the models will be items that can be translated into products, and (d) successful results of research efforts are reflected in production. Thus, needed materials can be identified, developed, produced, distributed, and used by those students who need them.

The spirit of APH's original research committee lives on in APH's research program today. Its strength is in its interaction with the field. Many persons, including administrators, professionals working in the field, and blind students or clients and their families, give of their time and expertise to cooperate with APH's research projects. Groups with particular expertise are convened to help identify specific needs in a given area and to work with research staff in developing specifications for needed new materials. Others try out and evaluate experimental materials with the population for whom the material is intended. The sections of this report listing agencies that have participated in APH's research program and individuals who have served as consultants on the various projects give indication of the ongoing and invaluable input received from the field. Only through the outstanding cooperation of persons working in the field has APH's research program been able to thrive and to help teachers solve some of their most pressing problems by providing needed information and developing special materials designed to meet the unique needs of the students they serve.

Currently, overall priorities for APH's research program are influenced by the priorities set by the U.S. Department of Education's Office of Special Education and Rehabilitation Services, by Congressional Appropriations Committees, by sales of existing product lines, by results of surveys and needs meetings of customers and consumers, and by both APH's staff and its Educational Research and Development Committee in response to observed, general needs of the field. Primary areas being addressed during FY 1997 included braille, early childhood, low vision, math, microcomputer applications, multihandicapped, science, tactile graphics, tests and measurements, and transition.

An ongoing activity of the Department of Educational and Technical Research is the updating and improvement of existing products. The Technical Research staff made headway in the electronics and technology arenas as well as being responsible for preproduction work required for new products, excluding books. Examples of these kinds of work are found in the Technical Research section of this report. The goal is to produce better products in a more efficient and cost-effective way.

During the second quarter of FY 1997, some new procedures were developed and initiated. These included forming an APH Product Review Committee (PRC) and a Product Development Committee (PDC). In an effort to foster partnerships with creative individuals and companies who have developed products or who have ideas for product development, an APH Product Review Committee was established. The PRC is made up of representatives from Educational and Advisory Services, Customer Relations, Educational Research, Production, Technical Research, and Purchasing. The primary role of the PRC is to review products and product ideas submitted from the field in order to make recommendations to APH's newly formed Executive Committee made up of APH's president and four vice-presidents. The PRC welcomes products or product ideas from the field, coordinates a study of each product or product idea, and makes recommendations on whether APH should pursue research, adaptation or development, and production of each product or product idea presented. A "point person," currently Will Evans from the Educational and Advisory Services Department, works with the project leader to ensure the product or product idea progresses rapidly through the review process.

In an effort to work smarter and more efficiently, a new approach whereby work on a product is done simultaneously rather than in a linear fashion was initiated and a Product Development Committee (PDC) was formed. The PDC consists of an in-house group representing every aspect of a product from conception through production and marketing. The PDC is engaged once the PRC and Executive Committee have given the "green light" to proceed. This approach of utilizing a PRC and a PDC under the overall direction of APH's Executive Committee reflects a more total company involvement and commitment to the research, development, production, marketing, and support of each new product.

After receiving a "go ahead" to proceed, the project leader gathers and studies additional background information and conducts initial investigations into the research, and adaptation or development, that the product requires. A timeline consisting of nine goals is then determined. The nine goals are development of a schedule for the project, design and development of prototype materials, field test, evaluation and revisions, completion of program manuals, completion of specifications and tooling, pilot run, production of the product, and pricing and availability of the product. Working with the various project leaders and the Director of Educational Research, the Technical Research Division Manager is responsible for creating and maintaining a master timeline of all products under development. While every effort is made to set realistic timelines, it is recognized that, due to a number of valid reasons often beyond control of the research staff, the project dates established early in the process may vary.

Under this new process, the project leader and production assistant work with appropriate APH staff to establish a marketing plan and guide the product through all phases of research, adaptation or development, production, pricing, and product support. At three key points on the timeline, the project leader meets with the Executive Committee to report on project progress and discuss any issues of concern. This process will keep the Executive Committee well informed of the progress of each new product.

APH's Board of Trustees, senior management, and other personnel are to be commended for their excellent cooperation with research projects and personnel. Because of the nature of research and product development, all departments and divisions of APH become involved with the research staff. Such involvements are routinely met willingly and with a true spirit of commitment and teamwork. This provides the atmosphere for growth and creativity--both essential components of research and the benefits derived from it.

This report contains a description of activities that were underway during FY 1997 and that are planned for FY 1998 by APH's Department of Educational and Technical Research. For each, the purpose of the project is stated, the primary project staff is identified, some background on the project is provided, work accomplished during FY 1997 is summarized, and work that is planned for FY 1998 is indicated. More complete information about all of the projects is available upon request.

# Braille

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**Braille Language Program** (continuing)

Purpose: To develop a set of beginning language materials consisting of two components, spelling and English, which will minimize problems in these curricular areas commonly encountered by beginning braille students

Project Staff: Eleanor Pester, Project Director
Karen Poppe, Project Assistant
Betty Modaressi, Editor

Background. This project was partially funded under a grant awarded to APH by the Federal Research in Education of the Handicapped Program's Field Initiated Research competition, which is administered by the Special Education Programs, Office of Special Education and Rehabilitative Services, U.S. Department of Education. Work began in January 1985 with an analysis of achievement in language, spelling, and word study skills of 57 blind 4th and 5th graders on a special braille edition of the Stanford Achievement Test, Intermediate 1, Form E, to identify specific problems. Current spelling and English textbooks and Patterns: The Primary Braille Reading Program were also reviewed before development of the program began.

The program, which is called Patterns: The Primary Braille Spelling and English Program, consists of four levels, Level A through Level D. Each level of the program was written, reviewed by the project advisory committee, revised, pilot-tested, and then field tested with over 50 students and approximately 20 teachers at sites across the country. Criterion-referenced tests were administered as the students completed each level. Test results were sent to APH for scoring and analysis. Although federal support for the project ceased December 31, 1989, field testing continued on the later levels until students completed the program.

Revisions of the materials based on the field evaluations proved to be extensive. Level A was prepared for production and made available for purchase during the 1992-93 school year. Level B was put into production, and became available for purchase during the 1993-94 school year. Field testing indicated that Levels C and D needed the most extensive revisions including reorganization of the material and the addition of instructions and practice for writing with slate and stylus. Level C was revised, produced, and available for the start of the 1996-97 school year. The initial revision of Level D was completed. Materials were reviewed by the linguist and the project director and then further revised by the editor.

Work during FY 1997. The final revision of Level D was completed. Copy was content edited, and a glossary of spelling words was added. Preparation of production specifications was begun.

Work planned for FY 1998. Production specifications will be completed. Level D will be typeset and transcribed into braille.

**Braille Literacy for the Older Student** (discontinued)

Purpose: To develop a complete set of braille materials to introduce the older student both to the necessary skills required for reading up to 4th grade level and to Grade 2 Braille

Project Staff: Eleanor Pester, Project Director

Background. Patterns: The Primary Braille Reading Program successfully teaches children to read using Grade 2 Braille. Unfortunately, some students are too old to use Patterns but they do not have the necessary reading skills to use programs developed to teach adults the braille code. The recent emphasis on the importance of braille literacy and braille bills has increased the number of older students being introduced to both reading and braille. It is necessary, therefore, not only to teach these students the braille code, but reading as well. It is the goal of this project to develop suitable materials for introducing older students to reading and braille and/or remediating weak reading skills while introducing braille.

Work during FY 1997. A detailed planning document/project proposal was written, reviewed in-house, and edited for distribution. A project summary was added. On January 16, 1997, Eleanor Pester and Gary Mudd made a formal presentation of the project to the director of the Eisenburg Foundation for Charities in Chicago, Illinois. Additional sources of suitable funding were also sought and turned over to Don Keefe, Vice-President of Development at APH for follow-up. Based on the adolescent and adult print literacy materials analyzed to date and the learning characteristics of older students, consideration was given to the possibility of breaking the program down into smaller components, such as phonics, if suitable funding for the entire program was not forthcoming. The decision was made to postpone the selection and convening of an advisory committee for this project until more effort was made to secure outside funding.

Work planned for FY 1998. If funding becomes available, an advisory committee composed of blind and sighted individuals, who have experience teaching adolescents and adults to read braille, as well as experts in literacy for adolescents and adults, will be selected and will meet to develop specifications for this project. Development of the materials can begin if funding is secured.

## **Braille Literacy: Training, Mentoring, and Technological Services Program for Blind Adults** (completed)

Purpose: To develop, in collaboration with the National Federation of the Blind that worked with APH as a subcontractor, a braille training program for use in rehabilitation centers; an extended training program for use by blind mentors in the clients' home communities; and a publication documenting the potential usefulness of existing braille related technology

Project Staff: Eleanor Pester, Project Director

Background. The initial proposal for this project was submitted to the National Institute on Disability and Rehabilitation Research (NIDRR) in May of 1992 by the American Printing House for the Blind (APH) and the National Federation of the Blind (NFB). Funding for the 3-year project began October 1992.

APH staff conducted a thorough review of research in the areas of tactual development and tactual perception of blind adults and reviewed and evaluated existing programs designed to teach braille to adults. Consultants and staff decided to combine the best sections of existing programs into the new braille reading and writing curriculum guide and to expand the instructor's manual to include teaching strategies. The new curriculum and evaluation materials were reviewed by consultants. APH project staff visited each of the field test sites to observe and answer questions. Once students completed their training in the rehabilitation centers, mentors were selected to work with the students at home. A mentoring manual was developed and the staff and consultants reviewed it. Potential blind mentors were trained in mentoring. The first mentors began working with students in the summer of 1994. Field evaluation of the curriculum guide was completed in December 1994 and field evaluation of the mentoring manual was completed in March 1995. Data from the field evaluations were analyzed and used to make revisions. A final meeting of the program consultants was held in August 1995 to review the revised braille reading and writing curriculum and the mentoring manual. All student, teacher, and mentor materials were prepared for production. This included such tasks as inserting answers in the teacher's edition, writing a preface, and incorporating braille rules from the teacher's edition into the student materials. Production specifications were prepared for the program.

As part of the goal to develop a publication documenting the potential usefulness of existing braille related technology, technical consultants met in January and May 1993 and completed the initial assessment of technological devices that interface with computer screens to produce braille output. David Andrews from NFB was primarily responsible for evaluating existing computer hardware, and other consultants evaluated various software programs. The technology consultants met in January 1994 and decided that they would focus on screen-access devices. The assessment update from the 2nd year was completed in September 1994 and prepared for production. It was decided, however, to wait until the 3rd year update was completed and produce one document which contained evaluations from all three years. The final update was completed in July of 1995 and included evaluations of screen-access devices.

Work during FY 1997. The assessment of braille technology was available on the Internet. All student, teacher, and mentor materials were transcribed, typeset, and proofed. The final project report was written and distributed.

The product name is The Braille Connection: A Braille Reading and Writing Program for Former Print Users. The complete program consists of the Mentoring Manual in print and braille and the following instructional materials: Teacher's Editions in print and in braille, Student Workbooks for Grade 1 and Grade 2 Braille, Student Practice Books for Grade 1 and Grade 2 Braille, and a Chart of Braille Characters and Contractions.

Work planned for FY 1998. The various versions of this product are scheduled to be through production and available early in 1998.

**Revision of Patterns: The Primary Braille Reading Program** (new)

Purpose: To revise and update Patterns: The Primary Braille Reading Program

Project Staff: Eleanor Pester, Project Director

Background. Patterns: The Primary Braille Reading Program was designed to teach reading to children who will use braille as their principal reading medium. It has been widely used with this population ever since it made its debut in 1980. It was built on strong reading and braille principles and has withstood the test of time.

In education, where textbooks over five years old are considered outdated, Patterns is now ancient history. Teachers are burned out and bored with the content, and having difficulty justifying use of the program. Times have changed, and for quite some time full inclusion and whole language have been in vogue. Blind children using Patterns, therefore, seem a little out of step.

Young braille readers still, however, need a firm foundation of beginning braille reading upon which to build. It is, therefore, the goal of this project to produce an updated and enhanced braille reading program for beginners which will build on the successes of Patterns.

Work during FY 1997. On September 15 and 16, 1997, an advisory committee met at the American Printing House for the Blind to discuss revisions of Patterns: The Primary Braille Reading Program. They discussed features that should be kept, as well as features that should be changed, ways to update the content, and topics that would be of interest to today's visually impaired child. The committee discussed current trends in reading for the general population, some new programs and methods for teaching reading and language arts, and the use of tactile graphics with young children.

Work planned for FY 1998. A detailed document will be written for this project and the initial meeting with the Executive Committee will be held. Work on a revised prototype of the early levels of the program will begin.

## Early Childhood

## Developmental Guidelines for Infants with Visual Impairments: A Manual for Early Intervention (completed)

Purpose: This manual presents developmental guidelines for infants with visual impairment from birth to 24 months who have a wide range of vision loss, in order to assist professionals as they work with families to support the development of these children

Project Staff: Sheri Moore, Project Codirector
Debbie Johnson, Project Codirector
Amanda Hall, Project Author
Deborah Chen, Project Author
Linda Kekelis, Project Author

Background: The Assessment Scales and Guidelines were submitted by the authors to APH for consideration of publication. The UC Berkeley Assessment Scales for Visually Impaired Children were developed under a grant from the California State Department of Education. The overall goal of the original project was to refine the scales through pilot-testing with a small number of blind and low vision children in the San Francisco Bay Area. The scales examine developmental milestones of particular importance to children with vision loss between birth and 2 years of age.

After submission, the Assessment Scales for Visually Impaired Children, along with the accompanying guidelines component, were reviewed by APH project staff and prepared for review by several expert/content reviewers. APH staff designed an evaluation plan to collect and analyze the data completed by the reviewers. The later analysis of these data dictated a number of modifications, additions, and revisions. Generally, reviewers felt that the content of the materials was very useful and would be a contribution to the field. Suggestions for revisions were discussed by the APH project directors and the authors; Dr. Amanda Hall and Dr. Deborah Chen worked with the project staff to implement the agreed upon modifications to the materials. Content was updated in order to be current with the literature base in this field. Dr. Kekelis served as a reviewer of all new content.

Work during FY 1997. Decisions were made collaboratively with project authors to determine the final format of the manual. The format determined to best present recent research and intervention methods for infants with visual impairments incorporates narrative chapters to present specific intervention concerns and developmental charts to present critical development indicators. "Summary Sheets" have been prepared for use with individual infants in instructional programs. They include specific intervention concerns based upon the narrative chapters and a summary of developmental behavior derived from the developmental charts indicating an infant's strengths and areas for determining appropriate goals and objectives within daily routines.

Along with determining final format, time was spent on editing the document, formatting the document on disk, and initial typesetting. The project directors and authors worked collaboratively on each of these tasks.

Work planned for FY 1998. Staff will continue to be responsible for the calendar publication throughout the production process, and will work closely with Technical Research as well as Production personnel in all phases of this process.

**Early Childhood Transition Project** (new)

Purpose: To develop a set of materials useful to families and professionals for transitioning young children with visual impairments and/or multiple disabilities from infant/toddler to preschool programs as well as from preschool programs to school programs

Project Staff: Sheri Moore, Project Director
Jennifer Grisham-Brown, Project Author
Diane Haynes, Project Author

Background. The project authors submitted a document to APH's Product Review Committee entitled Reach for the Stars: Planning for the Future. The document is a person-centered approach to developing Individualized Educational Programming and transition plans for very young children and their families. The project authors had conducted training using these materials in several states and had found them well received and helpful to both professionals and families. The Reach for the Stars: Planning for the Future materials have been used primarily with visually impaired students with multiple disabilities, including dual sensory impairments. The materials imbed a person-centered approach in their orientation, and value the continuing involvement of families in "directing" their child's educational program and planning an optimal future for their child.

Work during FY 1997. Following the submission of the Reach for the Stars: Planning for the Future materials by the project authors, APH staff conducted an in-house review. The materials then went through an internal product review process, and it was agreed that these materials had universal appeal. The APH project director met with the project authors several times, analyzing and discussing how the materials could be enhanced before a formal field evaluation. A series of modifications, revisions, and additions to the materials were discussed and a plan was developed for putting these changes in place.

Work planned for FY 1998. Both the project director and project authors will continue to work collaboratively on this project. A plan has been developed by the authors and the project director to (a) make revisions and additions to the materials prior to field evaluation; (b) conduct a field evaluation and expert review; (c) collect and analyze data; and (d) determine and implement revisions based on evaluative data. It is expected that all of these steps will be completed during FY 1998.

**Infant Skills Project** (discontinued)

Purpose: To develop materials targeted for infants and toddlers, birth-24 months; to develop accompanying written material useful to parents and teachers in developing critical skills in young children

Project staff: Sheri Moore, Project Director

Background. The most recent Early Childhood Materials Needs Assessment meeting delineated and set priorities in several areas. The Infant Skills project received a high priority rating. This high priority correlates with the emphasis at the federal level to initiate and strengthen infant/toddler programs throughout the United States under PL 99-457 and extended under PL 101-476.

This project has two distinct components: A tangible materials component and the written materials developed as part of the Parent Early Childhood Series. The second resource/support guide, the Parent Early Childhood Education Series developed by the early childhood staff of the Overbrook School for the Blind, is part of the final version of the Infant Skills materials. This "Parent Early Childhood Education Series," was evaluated extensively by a number of experts in the area of early childhood vision. A number of revisions and modifications were made to the series based on this review. The Parent Early Childhood materials were completed and are available as an APH product.

Based on analysis of the field evaluation data, revisions to the Infant Skills materials as well as to the accompanying activities were determined. Project staff initiated and implemented the revisions, and consulted with an educational diagnostician, an occupational therapist, a physical therapist, and a speech therapist to reflect the results of the field evaluation.

Work during FY 1997. This project was discontinued during FY 1997. Materials developed for this project have been integrated into the Individualized Systematic Assessment of Visual Efficiency project.

**On the Way to Literacy III** (continuing)

Purpose: To provide additional tactile/visual storybooks as requested by evaluators of previous books of this type; the books are designed to be read aloud by an adult to preschoolers who are blind/visually impaired

Project Staff: Suzette Wright, Project Director
Tom Poppe, Model and Pattern Maker

Background. Because of the limited availability of print/braille books with meaningful tactile illustrations for the preschool age child, a special series of storybooks was developed at APH. These provide print/braille text and feature a wide range of visual and tactile illustrations--from actual objects, to thermoformed objects, to simple raised line drawings. The storybooks were first developed as a part of the larger project which produced the informational handbook, On the Way to Literacy: Early Experiences for Visually Impaired Children. Additional storybooks were requested by evaluators of the first of these books, so a second, smaller set was developed. Again, consumers, evaluators, and members of the Research and Development Committee asked that more books be provided; the current project continues this effort to provide a variety of books in formats which have been successfully evaluated with students. Five commercially published books were adapted to the tactile visual format, and four original stories were written and illustrations planned. Drafts of the text and sketched illustrations for the nine books were given to seven reviewers, who evaluated the books on the suitability of the text and graphics for the designated audience. Based on this input, seven books were selected for prototyping and further evaluation.

Work during FY 1997. Seven storybooks were developed into prototypes: final copy for the text was prepared and given to the Braille Department for transcription; print text was prepared; molds for thermoform illustrations were made; all elements of tactile/visual illustrations were gathered. Five copies of each of the seven books were then hand-assembled. Seven teachers at four sites used the prototypes with 24 students ages 2 1/2 years up to kindergarten level. Five of the books were highly rated, receiving an excellent rating from a majority of evaluators. Two books, though liked by evaluators, did not rate as highly. Of the two, difficulties in creating an appropriate line for tracking resulted in the elimination of one book from the group; the other book, however, is being revised to add interest. It has been retained in the set, which now totals six storybooks--three adapted commercially available stories and three original stories. Camera-ready print copy and braille plates have been prepared. A list of tasks to be performed to ready the books for production, together with prototypes marked with revisions, has been presented to members of the Production Development Committee.

Work planned for FY 1998. Development of the books is complete; preproduction tasks and production of the books remain. Materials must be sourced and ordered, final molds for thermoformed illustrations must be completed, camera-ready art for all print illustrations must be generated, detailed production specifications and drawings must be produced. The project's new in-house director from Technical Research and the project's original director from Educational Research will continue to work closely as each book is prepared for its pilot run, then produced, priced and stocked.

## **On the Way to Literacy IV** (new)

Purpose: To provide additional tactile/visual storybooks as requested by the 1997 Research and Development Advisory Committee and evaluators of previous books of this type; the books are designed to be read aloud by an adult to preschoolers who are blind or visually impaired

Project Staff: Suzette Wright, Project Director
Tom Poppe, Model and Pattern Maker

Background. As development of the third set of On the Way to Literacy books drew to a close in the spring of 1997, the Research and Development Committee recommended continuation of this effort to provide print/braille books with meaningful tactile illustrations for the preschool child. These read-aloud storybooks were first developed as part of the larger project which produced the informational handbook, On the Way to Literacy: Early Experiences for Visually Impaired Children. A more complete description of the books is given in the portion of this report discussing On the Way to Literacy III.

Work during FY 1997. A project schedule listing major steps in the development of the books and accompanying budget were created and given to the department's director.

Work planned for FY 1998. Although development of this fourth set of books will not begin until late in fiscal year 1998, the project has been planned and approved. The first steps in the project involve a survey of children's storybook classics and current books for stories which lend themselves to tactile illustration. Original stories will later be produced as part of an initial set of drafts to be given to evaluators; only the most promising will be selected for prototyping.

**Preschool Activity Calendar** (continuing)

Purpose: To develop a 12-month calendar of activities for children of developmental ages 3 to 5 years who are blind, visually impaired, and/or multihandicapped. The calendar is designed to be used primarily by families and caretakers of young children, giving them suggestions of daily learning activities to do with their children

Project Staff: Sheri Moore, Project Codirector
Nancy Smith, Project Codirector

Background. A calendar of daily activity suggestions was developed by Nancy Smith, a preschool teacher/consultant at the Wisconsin School for the Visually Handicapped and Educational Services for the Visually Impaired in Janesville, Wisconsin. The need for easy to use ideas for daily activities that stimulate children with visual impairments prompted the initial development of the calendar. It had been previously published by the Wisconsin Department of Public Instruction for limited circulation under the name Calendar: Everyday Exposure to Experiences for Enjoyment. It is no longer published by the State of Wisconsin, although there has been a continuing demand for this item. APH project staff perceived value in a calendar of this nature, with some 365 activity choices for families of young children who are blind or visually impaired.

The purpose of the activities incorporated into the calendar is to encourage the child and caregiver to explore the home and community environment together with inexpensive, practical, concrete activities. The calendar also includes a narrative text with motivational instructional material for parents' use in working with their child. A rationale and suggestions for use are also incorporated into this section. The calendar is designed to be used by parents or caregivers with the help and support of a vision teacher.

Work during FY 1997. The project leader and the calendar author worked collaboratively to make final revisions and modifications to the Preschool Activity Calendar. Work was completed on several specific areas: Identifying the most appropriate target population; general guidelines for use; and an introduction/rationale section that would assist professionals and families in making appropriate use of the Preschool Activity Calendar. Project staff also worked on attempting to locate a computer file of the Preschool Activity Calendar from the original publisher; this attempt, unfortunately, was unsuccessful.

Work planned for FY 1998. The APH Production Assistant will meet with the Product Development Committee to ensure that all the necessary steps have been completed before this product enters the production phase. The Preschool Activity Calendar is scheduled to enter the production phase early in FY 1998. Project staff will continue to be responsible for the Preschool Activity Calendar publication throughout the production process, and will work closely with Technical Research as well as Production personnel.

# Low Vision

### **Bright, Beautiful, and Bold Books** (new)

Purpose: To review and further develop books whose primary audience is young children with remaining vision; the book's pages feature high contrast solid images of a single object and bear the object's name in large bold letters and in braille; illustrations may also offer a tactile component

Project Staff:
Suzette Wright, Project Codirector
Bob Phelps, Project Codirector
Lucia Bellafonte, Project Author

Background. Although some commercially available children's books feature bright contrasting illustrations, these often depict a number of objects and are too "busy" for many young children with remaining vision. Lucia Bellafonte, parent of a child with low vision and a preschool teacher with a Montessori certificate, recently submitted to APH a book which addresses this need. The sample "Bold, Bright, and Beautiful" book features undetailed illustrations in four color/contrast formats showing single, common objects with the object's name in very large print. The book's illustrations are highly visible and attract the visual attention of very young children when read aloud by an adult. Older children may be able to make use of the large print to recognize letters and words. Along with the sample book, Ms. Bellafonte provided letters from individuals at the Canadian National Institute for the Blind and from parents and teachers who had reviewed the book. In addition, she circulated a questionnaire concerning the book and has submitted completed forms from 15 parents and teachers. This information, together with the sample book, was presented to the Product Review Committee, which recommended research personnel work with Ms. Bellafonte to develop the book further and conduct a review.

Work during FY 1997. Several members of the research staff reviewed the sample book favorably, suggesting improved fonts for the print, the addition of braille, and the potential value of adding a tactile component to the illustrations. A preschool teacher of visually impaired children reviewed the book's various formats. Development of prototypes and their field evaluation will be coordinated by Suzette Wright. The author and Ms. Wright have met once, by telephone, to discuss the book's target population, color/contrast formats, print font, various types of tactile illustration, and the advantages/disadvantages of including tactile representations. Examples of different media for tactile graphics were mailed to the author for her consideration.

Work planned for FY 1998. The author and coordinator of the project will determine which format(s), font, and tactile graphic media (if any) they prefer; a formative review of these design decisions by preschool teachers of visually impaired children will take place before actual prototypes are created. Prototypes will be made and used with students by teachers and parents for the field evaluation of the book.

## **Individualized Systematic Assessment of Visual Efficiency (ISAVE)** (continuing)

Purpose: To develop an assessment instrument useful in evaluating the potential for visual efficiency of young children and young children with multiple impairments, in addition to a visual disability

Project staff:
Sheri Moore, Project Codirector
M. Beth Langley, Codirector and Project Author
Debbie Johnson, Project Assistant
Karen Poppe, Project Assistant

Background. M. Beth Langley, author of the Functional Vision Inventory, developed an instrument specifically designed to measure visual potential for visual efficiency in visually impaired multiply handicapped children. This instrument was originally entitled the Potential Assessment of Visual Efficiency (PAVE) and is now renamed the Individualized Assessment of Visual Efficiency (ISAVE). The ISAVE is a systematic means of formalizing observations of (a) how vision is used in day-to-day situations; (b) which stimuli and conditions elicit residual visual behaviors; (c) the degree of functional intactness and application of critical visual components; and (d) how residual vision may be facilitated under optimal personal, environmental, and ophthalmological conditions. The primary purpose of ISAVE is to determine instructional entry level and programming strategies for facilitating functional application of even the slightest degree of visual functioning. It includes nine areas for evaluation.

Work during FY 1997. Final revisions and modifications of all ISAVE content continued during FY 1997. All sections were reviewed by a content and expert reviewer, James E. Jan, M.D. of Vancouver University of British Columbia and Childrens' Hospital.

In addition to revisions generated through Dr. Jan's review, ISAVE was expanded to include application for use with very difficult to test children with visual impairments, including severely motorically impaired learners. A complete task analysis was conducted to determine all remaining tasks which need to be completed by the project author as well as the project codirector. Major tasks identified include: formatting the content; graphic design and layout; and final editing.

Work planned for FY 1998. APH staff will continue to work closely with Ms. Langley throughout the final revision process. Content will be formatted, work on graphic design and layout will be done, and the text will go through a final editing process. Project staff will prepare all materials for entry into the production phase and will work with the Production staff.

## Program to Develop Efficiency in Visual Functioning: Addendum
(continuing)

Purpose: To provide materials for the development of visual functioning for children who have handicapping conditions in addition to low vision

Project Staff:
June Morris, Project Director
Natalie Barraga, Project Author and Consultant
Janice Stallings, Project Consultant

Background. The Program to Develop Efficiency in Visual Functioning was published in the early 1980's. When this program was written, the target population was children whose primary handicapping condition was low vision. Since that time, APH has been serving more children with multiple handicapping conditions. This project will provide materials for this population. Materials planned are the updating of the resource guide, and additional lessons and information for instruction for learners with developmental delays.

Work during FY 1997. Project staff met to review initial drafts of the new Addendum materials and make decisions on the final format for the Program's Addendum.

Dr. Natalie Barraga drafted (a) new and revised sections of the Source Book on Low Vision, (b) new Volume II, Design for Instructions for Learners with Developmental Delays, and (c) 55 new lessons for use with the targeted population.

Electronic files were developed for the updated Source Book on Low Vision.

The three revised/new components of the Program were sent out for review.

Work planned for FY 1998. Refinements of the new/revised components will be made as indicated by the field review. If changes are extensive, additional review of the new/revised materials will be required and further refinements made as needed. The new and revised components of the Program will be prepared for production. These materials will be made available as a set so they can be added to existing Programs and will be included with future production runs of the Program to Develop Efficiency in Visual Functioning.

# Mathematics

**Elementary Math** (continuing)

Purpose: To develop materials to aid braille users in developing understanding of and competence in elementary mathematics

Project Staff:
Eleanor Pester, Project Director
Karen Poppe, Project Assistant
Rob Meredith, Project Assistant
Tom Poppe, Tangible Materials Designer

Background. Math achievement of students who use braille has consistently been behind that of their normally sighted peers. In recent years, very little research and product development have been done to improve this situation. Teachers of students who are blind, however, have continuously requested special braille curricular materials for math similar to those in the Patterns program developed at APH to teach braille reading. With dramatic increases in the number of blind students mainstreamed and using the itinerant special education teacher model, the math priority determined as part of GOALS 2000, and new standards recently adopted by the National Council of Teachers of Mathematics for the teaching of math, it is appropriate to focus once again on math materials for braille users. This project received special funding as part of a three-year research initiative to develop new products in math, science, and geography.

In an effort to identify specific needs of visually impaired students in the area of math, teachers from the elementary and itinerant divisions of the Association for the Education and Rehabilitation of the Blind and Visually Impaired (AER) were surveyed. Also, an advisory committee met to focus on the needs of young braille users in elementary math, to set priorities for the development of materials, and to determine specifications for the materials to be developed. Other work on the project included a review of the research/literature on math instruction for the visually impaired; analyses of math curriculum guides; a thorough analyses of current textbooks to determine such things as mathematical symbols, terms, and concepts being taught; a search of the catalogs for commercially available math related products; and a review of programs on abacus instruction.

Work was begun on the development of a number of products based on the survey and committee recommendations. Prototypes of the following stand-alone products were developed:

1. Beginner's Abacus and Beginner's Abacus Guidebook
2. Analog Clock Model (with minute indicators)
3. Digital Clock Model
4. Nemeth Code Reference Sheets
5. Number/Fact Cards with an organizational card chart

6. Numbered and Blank 100's Boards with Manipulatives
7. Math Fact Drill Sheets with a slotted self-checking holder
8. Video(s) on using the abacus for computation (script)

In addition to the stand-alone aids mentioned above, work was also begun on Primary Math Units to use with visually impaired children as either a supplement to the mainstream math program or as a core curriculum.

In 1996, the aids were field tested and the script for the video was reviewed. Based on the field test results, the first four aids listed were prepared for production; the next two aids needed extensive revisions and retesting; the next aid, Math Fact Drill Sheets with a slotted self-checking holder, was dropped and permission to produce a braille/print version of Poke and Pull Card Sets covering the math facts was sought; the script for the video(s) was revised for production. Prototypes of eight Primary Math Units (some of the original 12 selected were combined or not relevant for the early levels) and a general guidebook began to take shape with guidance from Dr. William E. Leibfritz, math consultant. On July 1, 1996 a group of teachers of the visually impaired met at APH to share ideas which they had found to be particularly effective for developing math concepts and providing practice materials for their visually impaired primary students. Betty Modaressi, a textbook writer, used these ideas for teaching strategies for the math program.

Work during FY 1997. The first four aids listed were turned over to production and the Nemeth Code Reference Sheet was made available for sale. Revised prototypes of the next two aids listed were developed, tried out with a few students, and prepared for production. Permission to produce Poke and Pull Card Sets was finally secured. The abacus training video, "Hands-On Experience with the Cranmer Abacus," was produced and is available on two video cassettes with a booklet showing the problems worked on the videos. Because work on the Primary Math Units proved to be more extensive than originally thought and teachers need to have the Primary Math Units most of the school year for field testing and review, work continued on the materials, and field testing was postponed until the 1997-98 school year. In July of 1997, Betty Modaressi, Bill Leibfritz, and Susan Millaway met at APH and reviewed the teaching strategies for the Primary Math Units in detail.

Work planned for FY 1998. Production will be completed on the first three aids, the two aids which required retesting, and the Poke and Pull Card Sets. Primary Math Units and the general guidebook will be sent out for field testing during the 1997-98 school year. Worksheets will be developed to supplement the program. Based on the results of the field testing, revisions will be made and the Primary Math Units will be prepared for production.

**Math Facts Sheets: Multiplication/Division Table** (completed) and **Addition/Subtraction Table** (discontinued)

Purpose: To provide materials to aid legally blind students in developing understanding of and competence in elementary mathematics

Project staff: Debbie Willis, Project Director

Background. Members of the Math Advisory Committee that met at APH in September 1994 focused on the needs of young braille users in elementary math and set priorities for the development of materials. The advisory committee recommended that materials which provide practice and reinforce basic math facts be developed. A speaker at the National Council of Teachers of Mathematics conference in Boston spoke specifically on the necessity of students knowing their basic facts in addition, subtraction, multiplication, and division. The idea to design and develop math facts sheets, similar to those readily available for sighted students, was conceived.

Prototypes of three different designs of each set of large print/braille multiplication/division and addition/subtraction math facts sheets were developed. The same reviewers of several other math aids being field tested agreed to evaluate the math facts sheets. A set of each design (6 sheets in all) was sent to five elementary teachers to conduct in-use reviews with braille and large print readers. The results showed that each of the five reviewers totally agreed on the best design for both the braille and large print readers. Reviewers suggested that some textual information accompany the tables.

A booklet to accompany the Multiplication/Division Table was drafted and edited by members of the Educational Research staff.

Work during FY 1997. Information in the booklet to accompany the Multiplication/Division Table was finalized. The product sample and camera-ready booklet, along with specifications, were turned over to Technical Research for the initial production run. Due to higher priority needs, work on the Addition/Subtraction Table was discontinued.

Work planned for FY 1998. Sales for the Multiplication/Division Table and need for an Addition/Subtraction Table will be monitored.

# Microcomputer Applications and Products

**accessAbilities: Technology for Users Who Are Visually Impaired**
(formerly the Micro Materials Update) (continuing/series)

Purpose: To provide current information on assistive technology and related issues of concern to people with visual impairments

Project Staff:
Venus Elder, Project Director
Fred Otto, Copy Editor
Rob Meredith, Project Assistant
John Hedges, Project Assistant

Background. The basis for accessAbilities: Technology for People Who are Visually Impaired, formerly known as the Micro Materials Update (MMU), developed from a handout that was provided to attendees at a 1985 Summer Training Session at APH. A Microcomputer Advisory Panel and professionals in the field requested that the publication become a permanent newsletter to provide ongoing information on access technology for those with visual impairments. Since that date the publication has flourished and undergone several changes, from a simple printed handout to a high quality publication that is provided in several accessible media. Though the media by which the publication is provided has changed as the field advised, the publication and its staff have remained dedicated to serving the assistive technology needs of those with visual impairments.

Work during FY 1997. To reflect advances in the area of assistive technology and readers' requests to focus more on school and home issues, the MMU underwent a name change to accessAbilities: Technology for People Who are Visually Impaired.

At the request of the Ninth Microcomputer Advisory Committee and echoed by members of APH's previous Educational Research and Development Committees, special articles continued to be included. These articles featured new technology available from APH, an "Ask Fred" column dedicated to customer questions received by APH's Customer Relations Department, a new products section covering new technology made available by APH, a "Family Focus" section dedicated to the needs of students and parents, a "Funding Finds" section covering resources for funding assistive technology, a "News, Views, and Muse" section covering current tidbits on technology for the visually impaired, and specific articles requested by readers and the vision field. This fiscal year, articles of interest included "Adaptive Access to the Macintosh Computer for Visually Impaired Students," "Windows Accessibility Gets Active," and "Distance Learning Vision Teacher Preparation Program Available Via Downlink Service."

The school year 1996-97 publication consisted of 3,060 print copies, 250 cassette copies, and 750 IMB formatted disk copies.

Of these, 2,299 print copies, 140 cassette copies, and 600 disk copies were mailed to persons, agencies, and schools on its mailing list. The remaining copies were sent in response to inquiries, and given as handouts at conferences, presentations, and exhibits.

In addition to the completion of the 1996-97 issue of accessAbilities, copy was turned over to the Communications Group of Advisory Services for the 1997-98 issue of accessAbilities. The Communications Group completed a first draft of the desktop published version. This first draft was edited by project personnel.

Work planned for FY 1998. accessAbilities will continue to be provided as a free service to the visually impaired community and those who serve them. In the interest of limited staff time and resources, future issues will be published each fall as school year issues.

The staff of accessAbilities will continue to be receptive to the technology needs of the visually impaired community and those who serve them and will incorporate necessary additions and/or changes accordingly. In response to growing requests from the field, a braille version of the publication will resume. Plans are to provide the next yearly issue in print, in braille, on cassette, as text files on IBM formatted 3.5-inch disk, and electronically via APH's Website.

## **APH Internet Activities** (discontinued)

Purpose: To communicate information about APH electronically and serve customers with electronic file distribution

Project Staff: John Hedges, Project Director
Rob Meredith, Project Assistant

Background. A proposal to provide computer-based customer service and support was proposed and Bulletin Board System (BBS) functions and software were evaluated. Internet functions were also considered as time progressed. An initial APH Internet account for dial-up access to electronic mail--File Transfer Protocol (FTP) Usenet newsgroups, and World Wide Web (WWW) browsing was established with Iglou Internet Services in 1995 by APH's Computer Technology Services Department. It was determined that access issues for software and electronic information were being discussed via the Internet. An Internet account was established by the Technology Staff to monitor activity in these areas. Software was then reviewed for WWW browsing to evaluate low vision and blind access usability.

The need to access the Internet as an additional communications tool was identified in a meeting with Dean Brooks, a representative for Iglou Internet Services. An inter-departmental task force was established to prepare implementation procedures and define responsibilities. Website content was prepared and deployed by APH's Resource Services Department. Internet e-mail was made available to key departments.

Work during FY 1997. The technology staff in Educational Research advised Microsoft on Internet Explorer Browser and printing with alternate access. They also reviewed Internet Explorer 4.0 and the Windows 98 Active Desktop for access issues, but found very few initial problems.

Work planned for FY 1998. No investigation is specifically planned, except that related to routine collaboration and research for current projects. This category is being combined into the monitoring technology category for any further reporting when appropriate.

**IntelliKeys Project** (new)

Purpose: To develop Macintosh-based tactile/talking overlays and lessons for use with the IntelliKeys adaptive keyboard

Project Staff:
Debbie Willis, Project Director
Venus Elder, IntelliKeys Team Leader
Karen Poppe, IntelliKeys Team Member
Frank Hayden, IntelliKeys Team Member
John Hedges, IntelliKeys Team Member

Background. IntelliKeys is a commercially-available keyboard for use with Macintosh, IBM-compatible, and Apple II platforms. This switch-compatible keyboard comes with eight standard overlays, several alternative keyboard arrangements, large well-spaced keys and high-contrast colors, simplified keyboard configurations, and customized settings.

Authoring components enable nonprogrammers to create their own lessons incorporating speech, sound, and animation. These features along with tactile overlays or tactile items attached to the overlays make the lessons accessible to blind and visually impaired students.

Work during FY 1997. Macintosh-based tactile/talking overlays were submitted to APH from the field. These were later turned over to the Product Review Committee for consideration as potential future products from APH. An "IntelliKeys Team" was formed to study the general feasibility of producing, marketing, and supporting Macintosh-based tactile/talking overlays and lessons for the IntelliKeys adaptive keyboard. Marketing data were received from IntelliTools Corporation, designer and producer of the IntelliKeys adaptive keyboard, showing how many IntelliKeys keyboards had been purchased by schools and programs across the country.

A survey was posted on APH's Website and various technology coordinators and technology-access centers were contacted, in an effort to compile a list of educators from the field who were using the IntelliKeys keyboard with blind or visually impaired students. A list of consultants from the field who could assist in developing overlays and lessons was started. The IntelliKeys Team Leader attended a training session at the IntelliTools Corporation that was devoted to creating overlays for blind and visually impaired students. This team leader then offered classes to other staff in order to familiarize them with the authoring language used to make the lessons and overlays.

The materials and information gathered regarding the feasibility of producing, marketing, and supporting the IntelliKeys packages was presented to APH's Product Review

Committee for a decision on whether APH should begin creating and/or adapting IntelliKeys packages for use by blind and visually impaired students. The unanimous decision of the committee was to begin work on the overlays and accompanying lessons.

Work planned for FY 1998. A collaborative effort with IntelliTools and with the consultants from the field who initially submitted the IntelliKeys overlays will be investigated. A list of content areas and age or grade levels that can best be addressed using the adaptive keyboard will be compiled. Consultants in the field who can assist with creating the IntelliKeys packages will be identified and contacted. Prototype packages will be developed and field tested. Initial development will be Macintosh-based until IntelliTools Corporation completes development of all the necesary Windows 95 authoring tools. At that point, a decision will be made whether to pursue development for only one or both platforms.

## **Monitoring Technological Developments and Educational Applications** (ongoing activities)

Purpose: To identify and determine priorities for microcomputer materials which support educational needs; to monitor technological developments and educational applications of technology; and to disseminate information on current uses of technological aids

Project Staff: Rob Meredith, Programmer I
John Hedges, Programmer II
Venus Elder, Project Assistant

Background. This area encompasses a vast amount of dynamic information relative to new developments in the field of assistive technology for the blind and visually impaired. Needs for educational materials that are best presented on and support the use of microcomputers are gathered. Monitoring of technological developments and educational applications of the technology are pursued through various ways. Information is disseminated to the field in a number of ways on current trends and uses of technology. These endeavors help keep APH personnel knowledgeable in the areas of regular and assistive technology.

Work during FY 1997. The Technology staff in the Department of Educational and Technical Research were involved in a wide variety of ongoing activities that enabled them to stay informed of technological developments, educational applications of these developments, and particular computer-related needs of visually impaired persons.

As the use of computers continued to increase during FY 1997, trends and changes in the computer industry and in education were monitored through literature reviews, attending conferences, workshops, demonstrations and exhibits, talking with a variety of people involved in computer technology, browsing of appropriate Internet World Wide Web (WWW) sites, news groups, and discussion groups, and bulletin board services (BBS). Reference material reviewed on a regular basis included PC Magazine, The Computing Teacher, RE:view, Technological Horizons in Education Journal, Technology and Learning, Closing the Gap, and several programming journals and tutorials. The Internet and BBS services searched on a regular basis for monitoring vision access materials included the GW Micro BBS and discussion list, Micro Talk BBS and WWW, GUISPEAK list, Microsoft WWW, JAWS for Windows WWW, and others. Several demonstration programs, updates, and documents were obtained through these contacts for trial review, use, or alternative access. Additional programming software and documentation was accessed from Microsoft Developer Network and Microsoft Visual C++ subscriptions on CD-ROM.

Technology Staff monitored the progress of screen access programs for Windows 95. Some of the programs examined were Window-eyes, JAWS for Windows (JFW), and Automatic Screen Access Program for Windows (ASAW). The Internet list serves for GE Micro (developer of Window-eyes), Henter-Joyce (developer of JFW), and Micro Talk (developer of ASAW), were also monitored. Low vision software aids and Windows 95 accessibility features were also evaluated, along with pre-release versions of Microsoft Internet Explorer 4.0.

Conferences and exhibits attended and participated in during FY 1997 included the 1996 Closing The Gap Conference (CTG) in Minneapolis, Minnesota; the Kentucky Educational Technology Conference (KETC) in Louisville, Kentucky; the Kentucky Chapter of the Association for Education and Rehabilitation of the Blind and Visually Impaired (KAER) in Fawbush, kentucky; and the Assistive Technology Conference for the Multiply Disabled Visually Impaired Individual in the School Setting in Murray, Kentucky.

Technology staff helped to research and install project specific computers and peripherals for department staff, and planned for enhanced network functionality and future needs. They also worked with APH's Resource Services department to insure reliable speech-access to the new CARL ET AL database.

In an effort to continue disseminating information on APH's technology-related products, Technology staff worked in cooperation with APH's Customer Relations department to provide information, answers, and suggestions on a variety of questions regarding computer products, services, and issues for consumers as requested. Service was also provided on general software operation, disk replacement, troubleshooting, and contact information for other software vendors.

Work planned for FY 1998. Technology staff will continue to stay informed of new applications and adaptations of technology in the vision field by reviewing information, attending conferences, collaborating with people in the field, and evaluating ideas and products submitted to APH.

## **Sound Card and Text-To-Speech (TTS) Experimentation** (discontinued)

Purpose: To test and evaluate sound card speech functioning and capabilities for programming in talking software

Project Staff: John Hedges, Programmer
Rob Meredith, Programmer

Background. From the increase of sound equipped IBM and compatible computers has come a growing confusion between synthesized speech from a dedicated system and digitized speech that is previously recorded and played on a sound equipped system. In addition, the migration of the speech synthesis software from dedicated hardware to programmable sound hardware has been identified as an avenue to provide more affordable talking software on commonly equipped multimedia IBM and compatible computers.

Work during FY 1997. The Microsoft Speech Application Programming Interface was used, along with several commercially available speech engines, to give speech to the Math Workbooks on Disk project, discussed elsewhere in this report. The speech was spoken through a standard sound card, and was found to be quite useful.

Work planned for FY 1998. Since speech output is moving to sound cards exclusively, and there are now standard ways to use high-quality speech in Windows applications, further work in this area will be project-specific, and will be written up under project headings which use this technology.

**Tutorial for Windows 95** (new)

Purpose: To collaborate with TecSo Incorporated of Montreal (Canada) in the development of innovative Windows 95 training tools for the blind and visually impaired

Project Staff:
Debbie Willis, APH Project Codirector
Rob Meredith, APH Project Codirector
Ann Jarry, TecSo Project Director
Patrick Chasse, TecSo Programmer
John Hedges, Programmer II
Venus Elder, Project Assistant
Karen Poppe, Project Assistant
Tom Poppe, Model Maker
Frank Hayden, Manufacturing Specialist
Chantal Disney, Translation Consultant

Background. In February 1997, a collaborative effort between TecSo Incorporated (Technology and Society) and APH was established to design and field test innovative Windows 95 training tools. The tools are being developed in both French and English versions.

The initial project content was developed by TecSo staff and included an interactive CD-ROM based tutorial, an adapted mouse, tactile graphics of Windows 95 screens, and a screen concepts modeling board.

Work during FY 1997. APH staff visited TecSo Incorporated to gather information about the project. An agreement was made that the two organizations would work together to continue designing, rewriting, developing, and field testing the various components. The original materials were in French, so translation to English and revision of materials and concepts were performed with the help of a translation consultant from the University of Louisville.

In preparation for field testing of the English version, APH recorded the script for the CD-ROM based tutorial. APH also developed three different prototype versions of the screen concepts modeling board, and developed tactile graphics prototypes of key Windows 95 screens.

Prototypes of the tactile screen shots and screen concepts modeling boards were developed, labeled in French, and provided to TecSo in time for their field testing of all the components. TecSo staff is testing the materials with blind and visually impaired college students and adults, while APH plans to pilot and/or field test use of the materials by middle school and high school students.

TecSo staff developed the software and adapted a commercial mouse used to access the CD-ROM based tutorial, and provided them to APH. They also provided training to the APH field testing group who will work with the teachers who are chosen to participate in the field test.

Work planned for FY 1998. APH will conduct a small pilot-test of the CD-ROM based tutorial and its components, while revisions are made to the software at TecSo. Once the software is more stable, field testing will be done.

APH will begin testing the screen concept modeling boards immediately. This component will be tested independently of the tutorial materials.

Provided approval is given by TecSo Incorporated, APH will develop a cassette based tutorial using content from the CD-ROM, and field test it along with the Windows 95 tactile screen shots. Revisions of the software, scripts, modeling boards, and tactile graphics will be performed in accordance with field test results.

**Workbooks On Disk** (discontinued)

Purpose: To develop math software programs based on selected workbooks from the 1996 Scott Foresman Exploring Mathematics series

Project Staff: Rob Meredith, Project Codirector
John Hedges, Project Codirector
Venus Elder, Project Assistant

Background. At the Seventh and Eighth Microcomputer Advisory Committee Meetings, the participants recommended using an authoring program to adapt or develop some math drill and practice software. Participants of the Math Advisory Committee Meeting held at APH in 1994 expressed great need for materials for students to use to practice and reinforce basic math skills.

The Microcomputer Group investigated the possibility of using an authoring program to develop math software, but they soon discovered that there was no authoring software available that would allow the appropriate presentation of math content through speech output. As a result, it was decided that an entirely new piece of software would need to be written.

In 1996, since APH was producing textbooks for grades 3-8 from the Scott Foresman 1996 Exploring Math series in large print and braille, it was decided that two of the workbooks from this series would be converted into software programs.

Work during FY 1997. A prototype of the program was developed and shown at the 1997 Interim Meeting of APH's Research and Development Committee. While the committee was appreciative of progress thus far, and impressed with the technology used in the project, they felt that the project should be discontinued because the content was too specific to a particular textbook, and it would not be useful to students using other textbooks.

The project was then shown to APH's Product Review Committee. This committee also felt that the project should be discontinued, based on the recommendations of the Research and Development Committee, and on the content as well. They did, however, stress that technological strides made during the programming of the project should be used in future APH projects. This will be possible, because the techniques used for giving speech to the math workbooks can easily be ported to other projects.

Work planned for FY 1998. No future work is planned for this project.

## **Multihandicapped**

**Multihandicapped Adolescent Project** (on hold)

Purposes: To develop a manual of functional and community-based learning activities designed to meet the needs of adolescent multihandicapped visually impaired students

Project staff:
Sheri Moore, Project Director
Martha Majors, Project Author and Codirector
Mary Zatta, Project Author and Codirector

Background. The Multihandicapped Adolescent Project is targeted for students who have achieved basic skill levels and are involved in an educational program emphasizing self-care, domestic skills, independence, and life/community living skills. Written activities include functional and age-appropriate applications, stressing skills useful in a community-based setting. Applications of functional academics are also incorporated into project activities. The manual is also applicable to adolescent students with dual sensory impairments.

During parts of the 1994-95 school year, the Multihandicapped Adolescent Project manual was field evaluated nationally by teachers in 10 programs that work with students with multiple disabilities at the adolescent level. Necessary revisions include improving the clarity and consistency of the text, formatting for easier use and readability, increasing the application of functional academics, incorporating additional community-based experiences, and strengthening the language/communication component.

Work during FY 1997. The APH Project Director met with the two Project Authors to discuss the status of this project. The project has been "on hold" this fiscal year, due to shortages in personnel. Also, the personal situation of the authors has prohibited their recent involvement in working on this project. Several options for this project were discussed in the meeting.

Work planned for FY 1998. The authors will continue to meet and will determine a plan for the project direction which will be proposed in November 1997. At that time, all parties will consider the proposed course of action and determine whether or not this project will proceed.

# Science

**Brain Quest: Science 1000 Questions and Answers** (continuing)

Purpose: To provide materials for visually impaired students that will test and expand their knowledge of science, and to make accessible a popular commercial product that will lead to shared, fun experiences with sighted peers

Project Staff:
Karen Poppe, Project Director
Sheri Moore, Project Consultant
Debbie Willis, Project Consultant

Background. In the process of reviewing a number of science materials for possible adaptation, Brain Quest: Science 1000 Questions and Answers® was identified as excellent commercially available material that could easily be adapted into braille and large type for use by blind and low vision students in upper elementary and middle school. The questions are appropriate for students in mainstreamed or residential settings, and the format is fun and motivating. Learning in a game-type fashion can be done with a partner, in teams, or individually.

Work during FY 1997. Several possible braille and large type formats of Brain Quest: Science 1000 Questions and Answers® were designed by the project leader. An in-house review was conducted to help determine which of the proposed formats were most user-friendly and functional; the input from other braille and large type readers, as well as from other APH departments (i.e., Cost, Marketing, Braille, Large Type), was garnered to decide the most likely designs. Cost roll-ups were then performed to determine which of the formats fell within the target selling price range. All information was then presented in March of 1997 to APH's Executive Committee to review new research projects. The project was deemed a viable research project based on outside requests, expected demand, and need for science-related materials.

During April, the project leader developed an adapted prototype of Brain Quest: Science 1000 Questions and Answers® for field test purposes. The prototype included three versions (i.e, a braille-only format; a large type format; and a braille and large type combined format) of the first 10 pages of "Deck One" of the series.

In May, the field testing process was initiated and extended through the end of summer. Participating sites represented a demographic spread and a variety of educational settings (i.e., home-based, mainstreamed, and summer camps). To witness the use of the materials firsthand, the project director attended the National Federation of the Blind's national convention in July and played the game with visually impaired children attending their day camp program.

Concurrent with field testing, the project leader entered all necessary text onto disk and began to ready it for braille and large type translation. The project leader also investigated options (i.e., cover design, types of binding, etc.) for making the product visually appealing and functional for intended users.

In September, all evaluative comments noted on returned evaluation forms were compiled and tabulated. A final report of the findings was prepared and presented to the Executive Committee.

Work planned for FY 1998. A functional format for Brain Quest: Science 1000 Questions and Answers® will be established based upon comments and suggestions from field evaluators. Product specifications, edited text files for braille translation, and camera-ready copy for the large type version will be prepared prior to the first pilot run. A full production run of the adapted version of Brain Quest: Science 1000 Questions and Answers® is slated for this fiscal year.

Given the enthusiasm expressed by evaluators for the adapted version of Brain Quest: Science 1000 Questions and Answers®, as well as teachers', parents', and students' consistent requests for other Brain Quest editions, the project leader will make efforts to secure copyright permissions from Workman Publishing Company, Inc. to produce additional current titles (e.g., Math, English, General Knowledge, American History, etc.).

## **Science Activities for Preschool and Primary Aged Visually Impaired Children** (continuing)

Purpose: To develop a manual of active, hands-on, learning activities emphasizing basic science concepts targeted for young children 3 years through grade 2

Project Staff: Karen Poppe, Project Codirector
Sheri Moore, Project Codirector

Background: With considerable frequency, learners with visual impairments are exempted from science experiences that involve hands-on participation. Basic science concepts are critical for young children as a basis for building more advanced concepts. The project leaders' original plan was to develop a comprehensive manual consisting of nine units; these units would fall under the three main headings of "Life Science," "Earth Science," and "Physical Science," and address concepts related to plants, animals, habitats/ecosystems, astronomy, weather, energy, electricity/magnetism, solids/liquids/gases, and simple machines. While garnering input from a newly formed, in-house Project Development Committee, however, the project leaders were advised to approach the project in a more modular fashion--that is, to complete a manual on "plants" only, and then proceed to introduce future manuals addressing the remaining topical areas. Expecting the planned supplemental materials to vary from unit to unit in both design and number, the project leaders agreed that this modular approach would foreseeably allow more expeditious production of the manual and any related tangibles.

Work during FY 1997. Project directors met monthly with two local science consultants to create science activities that would actively and meaningfully involve children with visual impairments. Initial efforts were concentrated on the composition of nearly 30 fun-filled activities specific to plant growth. An introduction to the materials was prepared to provide specific tips on how to engage the student with visual impairments in science activities and make the wonder of plant life both accessible and enjoyable. The activities are also supported by resource and reference lists, a glossary, and suggestions for real-life experiences.

Once the plant activities were fully written, tangibles to supplement the concepts introduced throughout the manual were developed. These consisted of 1) black-line masters placed at the conclusion of each section which can be photocopied and tactilely embellished by the teacher and used by the student to identify and label the parts of a flower, tree, leaf, root, and seed, and 2) clear overlays that could be used with APH's Light Box, or a commercial light box, to help isolate individual parts of a flower, tree, leaf, root, or seed.

In June, an additional consultant was recruited to the team of authors to assist in the refinement of the plant activities; her preschool background and expertise served to scale downward some of the activities to be more useful and meaningful to the very young child. While project leaders refined and enhanced the "plant" manual and materials throughout the summer, the three primary authors embarked on activities related to animal life. The activities were structured in a way that mimics the format reflected in the "plant" guidebook, including the same components (e.g., math and language connections, an extension activity, etc.).

The Sense of Science was decided upon as the main title for the evolving science series; the name of each individual unit will serve as the subheading.

Work Planned for FY98. In early fall, The Sense of Science: Plants will be presented to the Executive Committee for their approval to proceed with development of the product. If approved, the next step will be to have the materials field tested by expert reviewers working with young children who have visual impairments. Refinements and enhancements to the guidebook and tangibles will be implemented based upon evaluative comments. As production specifications are being prepared for this first unit, intensive work will continue on the "animal" unit, that is, working the activities into the same design template established for the initial introductory unit and again, developing supplemental materials.

# Tactile Graphics

**Basic Science Tactile Graphics** (continuing)

Purpose: To create a set of tactile graphics to accompany elementary science textbooks, with special features to make reading them easier and with instructional hints included

Project Staff: Fred Otto, Project Director
Frank Hayden, Manufacturing Specialist

Background. Because of special monies allotted for the purpose, and with the recommendation of the Research and Development Committee, it was decided to produce materials in the area of science. It was found that textbooks for grades 4-6 contain many illustrations that can be turned into meaningful tactile graphics. Since much of the material covered in grade 4 is revisited in grades 5 and 6, it seemed reasonable that a set of well-designed graphics would be useful at any of these grade levels.

Work during FY 1997. A series of sessions were given to show APH's Graphics Department how to use a computer-aided drawing program. Drawings were then made by the Graphics Department and by project staff, with advice from tactile graphics expert Nancy Amick.

Work planned for FY 1998. Samples will be made from the drawings and sent out for field testing early in FY 1998. A final set of graphics, cover artwork, a guidebook, and specifications will be provided to preproduction to complete the project. Depending on field test results and any complications with the pilot run, this product is scheduled to be available this fiscal year.

**Basic Tactile Anatomy Atlas** (completed)

Purpose: To make available a set of detailed anatomical tactile graphics with instructional texts, suitable for middle- and upper-grade students

Project Staff: Fred Otto, Project Director
Tom Poppe, Pattern Maker

Background. For several years, the Basic Tactile Human Anatomy Atlas has been available in limited supply from its authors at State University of New York at Buffalo. They approached APH about taking over production of some or all of the graphics, as the authors cannot keep up with the demand. APH will take about half the original number of drawings and, making molds of the foil masters, produce in quantity an anatomy volume that can be used by students in middle school and above.

Work during FY 1997. The project was completed early in the fiscal year and given to preproduction for an initial run. Numerous meetings were held to coordinate the various areas of Production and the different parts that make up the product.

Work planned for FY 1998. The Basic Tactile Anatomy Atlas is scheduled to be available this fiscal year.

**Tactile Graphics Research** (continuing)

Purpose: To study and develop techniques for making tactile graphics more useful; to work toward developing standards in tactile graphic presentations; to evaluate product submissions and ideas from the field related to tactile graphics

Project Staff: Fred Otto, Project Director
Tom Poppe, Project Assistant

Background. APH has a variety of means for producing tactile graphics, including embossed paper, puff ink, capsule paper, and thermoform. One goal of research is to learn which media are suited to which kinds of uses and what the costs are of each.

In addition, tactile graphics products are frequently submitted by teachers or other professionals who would like to collaborate with APH in producing their materials. Some of these are well researched and well crafted and merit serious consideration. Another aspect of research is to monitor developments in practice, technology, and philosophy as they evolve.

Work during FY 1997. Closer collaboration between Educational Research staff and APH's Graphics Department has led to some helpful changes in the presentation of textbook graphics. This effort was propelled forward by a 2-day workshop in July, where tactile graphics experts Jane Corcoran and Nancy Amick spoke and worked with us to refine APH's in-house guidelines for tactile graphic design.

At the recommendation of APH's Product Review committee, there was continued correspondence with an author of word puzzles and mazes about the possibility of producing tactile versions of his work. Although this work does not have the status of an actual project, it will be pursued informally until field evaluations determine its potential as a product.

Samples of capsule paper were obtained from various sources to test for reliability, readability, and variety of effects that can be achieved. E-mail and the ability to post questions on the Internet have proven to be valuable tools in research of this kind.

Work planned for FY 1998. Recent discussions have pointed to two areas of focus that are very much needed by the field: (a) a set of standards for tactile graphic production to promote consistency between various producers, and (b) materials for teaching children to interpret tactile displays effectively.

While APH will likely play a strong contributing role in the former, the latter is a more immediate focus and is planned as a project to begin early in 1998.

A two-part instructional video on designing, making, and teaching tactile graphics is also planned and will be made available this fiscal year.

# **Tests and Measurements**

**Career Interest Inventory** (discontinued)

Purpose: To provide teachers and counselors with an instrument to explore educational and occupational possibilities for students

Project Staff: Debbie Willis, Project Director

Background. Level 2 of the 1990 Career Interest Inventory from The Psychological Corporation is a career-guidance instrument designed to provide information about students' educational goals, interest in a variety of school subjects and school-related activities, and interest in fields of work. It is designed to be used primarily with students in grades 10 through 12, as well as adults. It provides information that can be used to help students explore post-secondary educational and occupational alternatives and to plan to make decisions about their careers.

Work during FY 1997. It was decided that since the Project Leader on this project had been promoted to Director of Educational Research with new responsibilities and priorities, and since this inventory had a 1990 copyright, this project would be discontinued.

Work planned for FY 1998. A project leader in the area of Assessment will be added to the department's staff. This person will determine new priorities in the area of "Tests and Measurements." If an accessible career interest inventory is still needed, current career and interest type inventories will be examined for the purpose of selecting and adapting one to meet the needs of blind and visually impaired students.

**Stanford Achievement Series, Ninth Edition, Form S, Complete Battery/Multiple Choice** (continuing)

Purpose: To make a widely used comprehensive achievement test battery available in accessible media

Project Staff:
Debbie Willis, Project Director
Barbara Henderson, Project Assistant
Fred Otto, Project Assistant
Karen Poppe, Project Assistant
Debbie Johnson, Project Assistant
Debbie O'Connell, Project Assistant
Venus Elder, Project Assistant
John Hedges, Project Assistant
Rob Meredith, Project Assistant
Gene Bolin, Project Assistant
Loretta Curry, Project Assistant

Background. The 1996 Stanford Achievement Test Series, 9th Edition, from The Psychological Corporation/Harcourt Brace & Company, is a comprehensive achievement test battery for grades K-13. Initially, APH planned to adapt the abbreviated test battery. At each grade level an abbreviated test battery is available that includes fewer subtests than the complete battery and each subtest in the abbreviated test battery is also shortened in length. While visiting the Psychological Corporation, APH staff were informed, however, that the Stanford Complete Battery is ordered 15:1 over the Abbreviated Test Battery. Consumers of APH test products requested the Stanford 9 Complete Battery far more often than the Abbreviated Test Battery. Based on this information, members of the Educational Research and Development Committee at APH's 1996 interim meeting recommended that APH adapt the Stanford 9 Complete Battery. It was decided that the need for an abbreviated version, because of time constraints involved in administering the complete version, would be determined at a later date.

The test publisher provided APH with the complete Stanford Achievement Test Series for the 9th Edition. They agreed to renorm the adapted tests with missing items when adaptation is completed.

Work during FY 1997. While the original plan for FY 1997 was to edit, prepare the administration manuals, and turn a select group of the Stanford 9 series over to production, APH entered into an agreement with Harcourt Brace & Company whereby completion of all the levels appropriate for adaptation would be moved to an extremely high priority status during this fiscal year.

It was determined that the first three levels of the Stanford 9, SESAT 1 and 2 and Primary 1, would not be adapted into large type or braille due to the almost totally pictorial content. Written permission to adapt the remaining 10 levels of the Stanford 9, Form S, Complete Battery/Multiple Choice test into braille and large type formats was requested and received.

Ten levels of the Stanford 9 were edited for braille. Test booklets were brailled and tactile graphics were drawn. Questions and accompanying tactile graphics for the braille edition were reviewed and revised as needed. Supplemental instructions for administering the braille edition were written. Subtests in the braille edition with dropped items were renormed for spring administration of the tests. All 10 levels of the braille edition and all print supplemental manuals for administering the braille edition were produced, packaged, priced, and in stock before mid-March 1997.

Initial work on editing the large type version of the Stanford 9 got underway. The first level to be adapted, Intermediate Level 1, required considerable editing due to the complexity of the visual layout, variability in font style and size, and variability in clarity and sizes of images and illustrations. Because a great deal of editing was required on the first level examined, a meeting of APH personnel involved in producing the adapted Stanford 9 series was held. Production personnel worked with the test publisher to determine whether the original test materials could be provided in an electronic format usable by APH so that necessary editing could be done directly. It was determined, however, that the electronic format in which the tests exist is incompatible with any of APH's computer systems.

Ten levels of the Stanford 9 were scanned and edited for large type. All essential text including that on diagrams, graphs, and pictures was increased to at least 18-point Times Roman. Each of the 10 levels were proofread and edited at least four times for accuracy of textual information, and accuracy and visual clarity of diagrams, graphs, and pictures. Test materials to be packaged with APH's supplemental manuals were determined, ordered, and received. All 10 levels of the large type edition were produced, packaged, and priced before mid-April 1997. At the urging of consumers, the large type tests were made available before supplemental instructions for administering the large type edition were written. Phone support was provided to those test administrators who called regarding any necessary instructions for administering the large type Stanford 9.

Initially, APH received only the adjusted spring norms. The adjusted norms for fall and mid-year administration were received after the tests were made available from APH. These will be included with future Stanford 9 supplemental directions.

Consumers who purchased Supplemental Directions for administering the braille version of the Stanford 9 can receive print copies of the fall and midyear adjusted norms at no additional charge.

Work planned for FY 1998. Supplemental instructions for administering the large type edition will be written, reviewed, edited, and revised; camera-ready and disk copies will be provided for duplication. Once the supplemental instructions are available, no additional work on the Stanford 9, Form S, Complete Battery/Multiple Choice test is planned.

**Test Needs** (continuing)

Purpose: To determine test instruments needed for academic assessment of blind and visually impaired students or adults

Project Staff: Debbie Willis, Project Director

Background. As an initial effort into looking at current test needs, June Morris and Debbie Willis held a meeting at the 1996 International Conference of the Association for Education and Rehabilitation of the Blind and Visually Impaired (AER). Seven people from the field along with the APH personnel discussed some of the issues involved in the academic assessment of blind and visually impaired students as well as some of the tools being used or needed for doing so. A major discussion on the potential benefits, issues involved, and need for investigation and research into computerized testing of visually impaired persons ensued. A number of psychologists and test administrators who were unable to attend the 1996 AER also contacted APH staff to report their interest in this area.

Work during FY 1997. A focus group regarding test needs was not convened due to the extremely high priority of making the Stanford 9 available in accessible media and because the project director in the area of "Tests and Measurements" became the Interim Director of the department in January 1997, with new responsibilities and priorities in filling that position.

Work planned for FY 1998. A project leader in the area of Assessment will be added to APH's staff. At an appropriate time, a meeting between APH project staff and psychologists, test administrators, and other pertinent vision personnel will be held at APH to determine and prioritize test instruments needed in the vision field.

# Transition

## Money Handling and Budgeting: A Resource Guide for use With Adolescents or Young Adults Who are Blind or Visually Impaired (completed)

Purpose: To provide the vision field with resources in daily living skills dealing with handling money, money identification, making change, and budgeting

Project Staff: Venus Elder, Project Director

Background. The Seventh Microcomputer Advisory Committee gave high priority to adapting or developing high interest, low vocabulary, age-appropriate software for developmentally delayed blind students, junior high and above. An advisory committee was formed to identify and determine priorities for this area. Top priority was given to developing materials to assist with the daily living skills of money handling and budgeting. Materials needed to teach and reinforce money handling skills were also discussed and recommended by members of the 1994 Math Advisory Committee. Due to a lack of programming time, it was decided to create a resource guide rather than software. The project director gathered information and drafted a resource guide that deals with handling money, money identification, making change and budgeting.

Work during FY 1997. All components of the Resource Guide were sent out for expert review; final changes and editing were completed based on recommendations. The expert reviewers and the Production Development Committee decided to use the complete adapted practice checkbook from Harland Company in the Money Handling Resource Guide as well as a replacement for the Raised-Line Checkbook for Educational Purposes currently available from APH. This decision was made based on the better quality and features of the Harland adapted practice checkbook.

Complete mock-ups of both print and braille versions were made to ensure a smooth pilot run. Several Production Development Committee meetings were held to finalize pilot run details. The Money Handling and Budgeting Resource Guide was given to Technical Research for entry into APH's production pipeline. A production run of the large print version was completed; the braille version is scheduled to follow soon.

Work planned for FY 1998. This project is complete. No additional work is planned. The Project Leader will work with Production personnel, as needed, on subsequent runs of the large print and braille versions of the resource guide.

## **Transition Tote System** (completed)

Purpose: The Transition Tote System is designed to assist high school age students who are visually impaired or blind as they explore and prepare for the world of work. Basic principles underlying the System include organizational skills, social and self-advocacy skills, and personal responsibility

Project Staff: Debbie Johnson, Project Director and Coauthor
Karen Wolffe, Project Coauthor

Background. The Transition Tote System was designed to meet the needs of students who are blind or visually impaired as they prepare for the world of work. The Student Kit includes an organizer case--the Tote Case--that contains the APH print/ braille calendar and clipboard. The Tote Case is available separately as a replacement item. The Student Manual is the other component of the Student Kit. It offers 30 lessons, described below. The student materials will be available in large print, cassette and braille. The Information Supplement, available as a separate product, offers adaptations to the lessons contained in the Student Manual. The Information Supplement will be offered in print and in braille. The Information Supplement was designed for use by teachers and other facilitators of the student's program.

Work during FY 1997. The Project Director worked with APH's newly-formed Product Development Committee on the various aspects and components to be included in the different versions of the Transition Tote System. The print versions of the Student Kit and Information Supplement became available during the last quarter of FY 1997. Sales of these products were brisk, and APH is working to generate enough units to keep up with the demand.

Based upon feedback received at the May meeting of the Educational Research Committee, a braille version was added to the previously planned offerings of large print and cassette Student Kits. Accessibility issues, as discussed at that meeting, also prompted APH to expand the braille/print offerings that were to accompany the recorded format of the student materials. The revamping required by these changes has delayed the release of the cassette version.

Work planned for FY 1998. Braille Student Kits and Information Supplements, and cassette Student Kits are anticipated to become available during the first half of FY 1998.

# Technical Research Report

## Technical Research Division

Purpose: To prepare and introduce new products to APH's production process and to adapt or develop products involving technology

Division staff:
Bob Phelps, Manager
Frank Hayden, Manufacturing Specialist
James Robinson, Manufacturing Specialist
Darlene Donhoff, Technical/Clerical Assistant

### Work During FY 1997

Analog Clock Model. (product redesign) The Technical Research Division assisted the Educational Research Department and the Model Shop in the design and fabrication of field test prototypes. After field testing was completed, a vendor was selected to mold the analog clock face. Technical Research completed the product documentation and turned it over to production areas. Orders for parts were placed and are in transit to APH.

Basic Science Tactile Graphics. (new product) Technical Research staff worked with Educational Research to train Graphics Department personnel in the use of the Drafix program. Graphics Department personnel will, in turn, make the drawings to include in this product. Once the production documentation is completed, the Basic Science Tactile Graphics package will be ready for preproduction.

Basic Tactile Anatomy Atlas. (new product) The Technical Research Division completed the production specifications for this product.

Beginner's Abacus. (new product) Technical Research completed the product documentation. A vendor was selected to manufacture the parts and orders were placed. Final assembly of the abacus will be done in-house.

Braille Connections. (completed) There are two sets of materials in this product--one in print and one in braille. Each of the following is also being packaged separately: the Teacher's Manual (print and braille); Student Workbooks for both Grade 1 and Grade 2 Braille (braille only); Student Practice Books for both Grade 1 and Grade 2 Braille (braille only); and the Mentoring Manual (print and braille). Technical Research completed documentation for the production and packaging of each version of this product.

Braillewriting Dot by Dot. (completed) Both the Big Cell and Peg Slate (new products) are included in this product. It is produced in two versions--large type and braille. Technical Research completed all production documentation. Production runs were 250 print kits and 35 braille kits. Individual copies of the Teachers Manual were stocked in both print and braille, as well as the exercise cassette, and a braille alphabet sheet.

Braille Transcribers Kit: Math. (completed) Technical Research worked with Educational Research to develop sets of generic mathematics symbols for braille transcriber use. Prototype samples were made for evaluation. After evaluations were completed, production specifications were written.

Digital Clock . (new product) The Technical Research Division selected a vendor to manufacture the plastic parts and assemble the clock; an initial contract was agreed upon. A decision was subsequently made to assemble the clocks at APH. This necessitated some modifications to the mold tooling which delayed the original delivery date. Manufacturing specifications and assembly drawings were completed. The vendor will make production samples to send in for APH approval.

Dividers for Braille 12" x 11" - 3 Hole Punched. (completed) This product originated from a request by a customer. Technical Research developed product specifications. The first production run of the 12" x 11" dividers for braille was completed in November 1996 and placed in stock.

Dividers for Braille 9" x 11" - 3 Hole Punched. (completed) A decision was made to make two different sizes of dividers. Technical Research developed product documentation for this divider as well. The first production run of the 9" x 11" dividers for braille was completed in November 1996 and placed in stock.

Handi-Cassette II. (completed) In March 1997, members of the Technical Research and Marketing Departments went to England to visit two companies, Haggar and Royal National Institute for the Blind (RNIB). At Haggar, the problems found by APH with the Handi-Cassette were discussed. Haggar also arranged to have Conformité Européene (CE) testing done on the Handi-Cassette II, Light Box, Mini-Lite Box and Speech Expressor. Technical Research envisioned methods for emulating the same test procedures at APH. RNIB staff gave APH's Technical Research representative a tour of their excellent braille production facility.

Hands-On Experience with the Cranmer Video. (completed) Technical Research worked with Educational Research on getting this product made and packaged. The documentation was completed by Technical Research and turned over to production. The first production run was completed and placed into stock in July 1997.

Janus Interline Slate. (completed) Technical Research worked with the Model Shop on the design and fabrication of two prototype units for evaluation. Upon receiving approval of the units, Technical Research completed documentation and sent out bid packages to locate a manufacturer. A company was selected, samples for APH's evaluation were received, approval was given, the first production run was received at APH and placed into stock in April 1997.

KeyMath Test: Braille Edition. (completed) Technical Research completed the documentation and turned it over to the production areas. The whole kit, replacement tests, and supplemental manual were produced and placed in stock in April 1997.

MAT Training Modules. (completed) The MAT Training modules consisted of six programs. Each program has a manual in print and on cassette. Technical Research had already completed documentation on the first five. The last in the series of six programs, Duxbury Braille Translation Program for WordPerfect 5.0 and 5.1, was received by Technical Research. Technical Research completed the documentation and turned it over to production. The first production run was completed and placed into stock in October 1996.

Mini-Lite Box. (completed) Technical Research worked with Educational Research and the Model Shop to design the portable Light Box. This included designing the circuit board and the plastic case. Several prototype units were built and sent out for field testing. Changes suggested were reviewed and implemented into new prototypes. Bid packages were drawn up and sent to vendors for quotes. A prototype unit was also sent for Federal Communication Commission (FCC) testing. Small problems were found which were corrected and the unit was resubmitted for testing, which it then passed. The vendor produced prototype samples for APH approval. After approval, the first production run was done. The first Mini-Lites went into stock in December 1996. Some recent problems have caused Technical Research to have to locate a new vendor.

Mini-Lite Box Cover. (completed) Technical Research designed and made several prototype cover samples. Once all changes were agreed upon, Technical Research worked with a vendor to make up samples following the approved designs. Slight changes were suggested, which the vendor made. Upon getting an approved sample, the vendor completed the first production run which went into stock in December 1996.

Mini-Lite Box - Transparent Colored Overlays. (completed) This was the only completely new product made as an additional component available for use with the Mini-Lite Box. The overlays are 9 1/2" x 12 1/2" to fit the Mini-Lite Box. The set consists of transparent rigid vinyl overlays in red, blue, green, yellow, and clear, plus one clear flexible sheet. A vendor was located, the parts were ordered, received, and put into stock in November 1996.

Mini-Lite Box - Plexiglas Blocks. (completed)
Mini-Lite Box - Plexiglas Spinner & Spinner Overlays. (completed)
Mini-Lite Box - Pegs and Pegboard. (completed)
Mini-Lite Box - Familiar Object Cards. (completed)
Mini-Lite Box - Colored Shape Cards. (completed)
Educational Research staff reviewed components of the Light Box Materials Levels I and II, and determined a number of separate kits of items that would be appropriate for use with the Mini-Lite Box. The five kits of items listed above are those that were selected and which Technical Research completed the tasks necessary in order for these items to be packaged and made available.

Money-Handling and Budgeting: A Resource Guide for Use With Adolescents or Young Adults Who are Blind and Visually Impaired. (new product) Technical Research received this in March 1997, and started working on production specifications. Specifications were completed and turned over to production personnel. The pilot run is underway.

Multiplication and Division Table. (completed) Technical Research received this product in December 1996. All product documentation was completed and turned over to production staff in late January. The first production run was completed and placed in stock in June 1997.

Nemeth Code Reference Sheet. (completed) This was received by Technical Research staff in December 1996. Product documentation was completed and turned over to production in January. The first production run was completed and placed in stock in March 1997.

O & M Graphics. (completed) Educational Research designed drawings of generic street and room layouts to teach orientation and mobility. Technical Research, working with Educational Research, developed raised line (puff-ink) graphics for this kit. Silk-screens were made in order to print prototypes for Advisory Committee approval. Documentation was completed and turned over to production. The pilot run was completed and placed in stock.

O & M Graphics for NOMAD. (completed) After being trained on how to use the NOMAD by Technical Research, Educational Research then programmed each individual graphic. Technical Research took the graphic files and made master files for duplication. These product files were made to be used with the NOMAD. Documentation was completed by Technical Research and turned over to production. The first production run was completed and placed in stock in October 1996.

On the Way to Literacy III: Jelly Bean Jungle. (new product) Technical Research worked with Education Research to begin product documentation on the new set of On the Way to Literacy III books. Timelines were developed to follow the progress of each book. Materials needed for the books are being sourced by Technical Research.

Patterns: Level C. (completed) This is the third level of Patterns and was turned over to Technical Research for production documentation. There are nine individual kits for Patterns: Level C. Product documentation was completed for seven of the nine kits. Produce documentation for the two remaining kits is in the process of being written.

Poke & Pull. (new product) Technical Research worked with Educational Research to get permission from the manufacturer to produce this product. An agreement was finally reached in July 1997. Product documentation has been started.

PrivatePhones - Stereo Headphones. (completed) Technical Research ordered new stereo headphones which would be of better quality than the one APH now stocks. Several samples of headphones were received from Califone for evaluation purposes. They were found to be of superior quality and also had volume control knobs on the headphones themselves. The first order was placed and parts received. APH sold out of the new headphones in record time and has placed a second order.

Program to Develop Efficiency of Visually Functioning: Addendum (new product) Technical Research worked with June Morris on this project. The revised program will require some changes to the thermoformed cases in which the kit is packaged. A print copy of the source book with the changes was given to June Morris for proofing. Production documentation is in process.

ProWORDS/ProBRAILLE/ProTERM. (completed) This software program was turned over to Technical Research to make preparations for its entry into APH's production pipeline. Product documentation was completed. The first production run was done and the product was placed in stock in December 1996.

Speech Expressor. (new product) This product was designed by Technical Research staff. Once the design was completed, prototype units were built and evaluated, product specifications were completed, and bid packages were sent out to vendors. APH is awaiting production samples.

Stereo to Mono 3.5mm to 1/4" Adaptor Plug. (completed)
Stereo to Mono 3.5mm to 3.5mm Adaptor Plug. (completed)
Technical Research contacted Califone staff who agreed to make an adaptor plug that would allow the PrivatePhone headphone to work with APH's older monaural products as well as with the newer stereo products. Califone also agreed to make an adaptor with 3.5 mm male and female plugs which would allow the switching from stereo to monaural so that the headphones could be used with stereo products. A purchase order was placed; the plugs were received in May 1997 and placed in stock.

Table Top Cassette Recorder/Player. (new product) The Technical Research Division developed some new features for this unit. An existing unit was modified to show how the revised model would work. The necessary documents were completed and bid packages were sent to several companies.

Tactile Treasures. (completed) Technical specifications were written for this product. The first production run was completed in April 1997, and 60 kits were placed in stock.

Transition Tote System. (new product) The Technical Research Division aided in designing a prototype tote. Once an acceptable sample was made, a vendor was found to manufacture it. Vendor samples were approved and a purchase order was opened. APH received partial shipment of the totes that were placed in stock. Production documentation was completed and turned over to the manufacturing areas.

Transition Video. (new product) Partial product specifications were written. Educational Research staff will make final decisions on this product so that it can be prepared for production.

Work planned for FY 1998.

In addition to continuing the work on completing the new products listed above, Technical Research staff will be available to assist other areas should problems arise. Members of the Technical Research Division will be involved with the following projects:

Card Holder & Drill Cards. (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of this product.

Developmental Guidelines For Infants with Visual Impairments. (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of the project.

Individualized Assessment of Visual Efficiency. (ISAVE) (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of the project.

Money-Handling and Budgeting: A Resource Guide for Use With Adolescents or Young Adults Who are Blind and Visually Impaired. (new product) Technical Research will monitor the first production run and be available to help if problems arise.

100's Board and Manipulatives. (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of this product.

Patterns: Primary Braille Spelling & English Program - Level D. (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of this product.

Poke & Pull. [6 sets] (new products) Technical Research will begin product specifications and work with manufacturing on the pilot runs of the project.

Preschool Activities Calendar. (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of this product.

Primary Math Units. (new product) Technical Research will begin working on product specifications and will work with manufacturing on the pilot run of this product.

Product Review Committee Projects. Technical Research staff will review products submitted to APH's Product Review Committee to help determine technical and/or production issues involved in manufacturing each proposed item.

Program to Develop Efficiency of Visually Functioning: Addendum. (new product) Technical Research will complete final product specifications and monitor the first production run.

Science Curriculum Adaptations: Plants. (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of this product.

Brain Quest. [Science Edition]. (new product) Technical Research will begin product specifications and work with manufacturing on the pilot run of this product.

Sleep Switch. (new product) Technical Research has been working on developing a switch that will work with a tape recorder allowing it to be turned off at a set time. A prototype unit has been built by Technical Research and will be field tested.

Speech Expressor. (new product) Technical Research will evaluate protytype units from the vendor. Once approved, Technical Research will complete all product specifications and monitor the first production run.

Table Top Cassette Recorder/Player. (new product) Technical Research will evaluate prototype units from the vendor. Once a model meets APH's approval, Technical Research will complete product specifications and monitor the first production run.

Tutorial for Windows 95. Technical Research will create revised versions of the tactile Windows 95 screen shots. Once the tutorial is completed, production specifications will be written.

Router projects. Technical Research will continue to review products for the purpose of revising procedures in order to make the items easier, safer, and more cost effective.

## Agencies Participating in Research

In addition to the agencies named here, appreciation is also extended to the many other agencies that cooperated with APH's research efforts by permitting members of their staffs to serve as consultants or respondents to requests for information.

Blind and Visually Impaired Services of Indiana; Indianapolis, Indiana
BOSMA Rehabilitation Center; Indianapolis, Indiana
Carroll Center for the Blind; Newton, Massachusetts
Children's Center for the Visually Impaired; Kansas City, Missouri
Dallas Services for Visually Impaired Children; Dallas, Texas
Digital Equipment Corporation; Maynard, Massachusetts
enTECH; Louisville, kentucky
Family Focused Early Intervention System; Harrisburg, Pennsylvania
Florida Association of Workers for the Blind/Miami Light House; Miami, Florida
Foundation for Blind Children; Scottsdale, Arizona
Greater Pittsburgh Guild for the Blind; Bridgeville, Pennsylvania
Hibbelin, Gary Equipment; Louisville, Kentucky
Henter-Joyce Incorporated; St. Petersburg, Florida
Hilton-Perkins National Projects; Watertown, Massachusetts
Indiana School for the Blind; Indianapolis, Indiana
IntelliTools Corporation; Novato, California
Jefferson County Public Schools; Louisville, Kentucky
Kansas School for the Blind; Kansas City, Kansas
Kentucky Rehabilitation Center for the Blind; Louisville, Kentucky
Kentucky School for the Blind; Louisville, Kentucky
Microsoft Corporation; Redmond, Washington
Michigan Commission for the Blind Training Center; Kalamazoo, Michigan
Missouri School for the Blind; St. Louis, Missouri
National Federation of the Blind; Baltimore, Maryland
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Perkins School for the Blind; Watertown, Massachusetts
Pinellas County Schools; St. Petersburg, Florida
Prince George's County Public Schools; Landover, Maryland
Southern Illinois University; Carbondale, Illinois
TecSo Incorporated; Montreal, Canada
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University of British Columbia, Children's Hospital; Vancouver, British Columbia
University of California, Lawrence Hall of Science; Berkeley, California
University of Louisville; Louisville, Kentucky
Variety Club for Blind Babies Foundation; San Francisco, California
Visually Impaired Preschool Services; Louisville, Kentucky

Washington State School for the Blind; Vancouver, Washington
West Virginia School for the Deaf and Blind; Romney, West Virginia
Western Pennsylvania School for Blind Children; Pittsburgh, Pennsylvania
Wisconsin School for the Visually Handicapped and Educational Services for the Visually Impaired; Janesville, Wisconsin
Wood County Board of Education; Bowling Green, Ohio

## Consultants

In addition to the consultants formally acknowledged in this section, appreciation is extended to the many individuals who have willingly given of their time and expertise in cooperating with the various research and development projects underway by responding to questionnaires, by answering less formal queries for information, and by working with research staff in countless ways such as: (a) identifying particularly talented teachers and other professionals to serve on committees and/or as expert reviewers; (b) recommending programs, teachers, and students appropriate for field evaluation sites; and (c) facilitating field evaluation efforts. Only through the splendid and continuing support of professionals working in the field and the people they serve is APH able to maintain its highly effective research and development program.

APH especially wishes to acknowledge the superb leadership and guidance from the ex officio trustees serving as members of the Research and Development Committee. FY 1997 committee members were:

Sister Louis Marie Baxter, Lavelle School for the Blind
Mr. William E. Daugherty, Kansas State School for the Blind
Dr. Philip H. Hatlen, Texas School for the Blind
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Leibfritz, William E., PhD

## Publications

Elder, V. W. (Ed.) (1996-97 School Year Issue). Distance Learning Vision Teacher Preparation program Available Via Downlink Service: University of Louisville Teacher Preparation Program in Visual Impairment. accessAbilities: Technology for People Who Are Visually Impaired. Louisville, KY: American Printing House for the Blind.

Elder, V. W. (Ed.) (1996-97 School Year Issue). Family Focus: Adaptive Access to the Macintosh Computer for Visually Impaired Students. accessAbilities: Technology for People Who Are Visually Impaired. Louisville, KY: American Printing House for the Blind.

Elder, V. W. (Ed.) (1996-97 School Year Issue). Funding Finds: Current Competitions, Grant Writing Contests, & Loans. accessAbilities: Technology for People Who Are Visually Impaired. Louisville, KY: American Printing House for the Blind.

Hedges, J. K. (1996-97 School Year Issue). Windows Accessibility Get Active. accessAbilities: Technology for People Who Are Visually Impaired. Louisville, KY: American Printing House for the Blind.

Meredith, R. H. (1996-97 School Year Issue). ProWORDS/ ProBRAILLE/ProTERM. accessAbilities: Technology for People Who Are Visually Impaired. Louisville, KY: American Printing House for the Blind.

## PROGRAM MATERIALS

Elder, V. W. (1997). Money Handling and Budgeting: A Resource Guide for Use with Adolescents or Young Adults Who Are Blind or Visually Impaired. Louisville, KY: American Printing House for the Blind.

Meredith, R., & Pester, E. (1997). Hands On Experiences with Cranmer Abacus: Companion Booklet to Video. Louisville, KY: American Printing House for the Blind.

Meredith, R. & Pester, E. (1997). Hands On Experiences with Cranmer Abacus: Tapes 1 and 2 (Script). Louiville, KY: American Printing House for the Blind.

Poppe, K. (1997). Introduction to Beginner’s Abacus. Louisville, KY: American Printing House for the Blind.

Willis, D. H. (1997). Introduction to Multiplication and Division Table. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Primary 2. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Primary 3. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Intermediate 1. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Intermediate 2. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Intermediate 3. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Advanced 1. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Advanced 2. Louisville, KY: American Printing House for the Blind.

Willis, D. H., & Henderson, B. (1997). Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, TASK 1, 2, 3. Louisville, KY: American Printing House for the Blind.

Wolffe, K., & Johnson, D. (1997). Transition: Navigating the Rapids of Life Information Supplement. Louisville, KY: American Printing House for the Blind.

Wolffe, K., & Johnson, D. (1997). Transition: Navigating the Rapids of Life Student Manual. Louisville, KY: American Printing House for the Blind.

## Presentations and Workshops

Elder, V. W. (1997, March). Assistive Technology Funding Finds. Eleventh Annual Conference of the Kentucky Chapter of the Association for the Education and Rehabilitation of the Blind and Visually Impaired, Fawbush, Kentucky.

Elder, V. W., & Roderick, C. (1996, October). Practical Resources for Those New to the Vision Field. Training and Information Symposium: APH Annual Meeting, Louisville, Kentucky.

McLennan, M. N. & Otto, F. (1997, January). How touching! Workshop on tactile graphics. In-service training for teachers, Louisiana School for the Blind , Baton Rouge, Louisiana.

Otto, F., Poppe, K., & Wright, S. (1997, April). Feel the world with tactile graphics. Presentation at California Transcribers and Educators of the Visually Handicapped conference, San Francisco, California.

Otto, F., Poppe, K., & Wright, S. (1996, October). Using tactile pictures with young children. Presentation for APH Annual Meeting attendees, Louisville, Kentucky.

Pester, E. J. (1996, October). Patterns: The Primary Braille Spelling and English Program, Levels B and C. New products demonstrations for APH Annual Meeting attendees, Louisville, Kentucky.

Pester, E.J., & Poppe, K.J. (1997, September). Math Literacy: It's More Than 1, 2, 3! Third Biennial Conference of Getting in Touch with Literacy, Minneapolis, Minnesota.

Willis, D. H., et. al. (1997, July). Parade of products. Presentations by Will Evans, John Hedges, Rob Meredith, Sheri Moore, Fred Otto, Eleanor Pester, Karen Poppe, Debbie Willis (moderator), and Suzette Wright at APH for University of Louisville Vision Workshop students, Louisville, Kentucky.

Wright, S. (1996, October). Using Tactile Pictures with Young Children with Vision Loss. Presentation for APH Annual Meeting attendees, Louisville, Kentucky.

## New Products

APH Insights Calendar 1998

Basic Tactile Anatomy Atlas

Braille Mailing Envelopes 11" x 11 1/2"

Braille Transcribers Kit:  Math

Dividers for Braille Paper 9" x 11" 3-hole punch

Dividers for Braille Paper 12" x 11" 3-hole punch

Geometry Tactile Graphics Kit

Handi-Cassette II Battery

Hands-On Experience with the Cramner Abacus Video

Janus Interline Slate

KeyMath Revised Kit

KeyMath Revised Replacement Tests

Microcomputer Access Technology Training Module:  Duxbury Braille Translation Program for WordPerfect 5.0 & 5.1

Mini-Lite Box

Mini-Lite Box--Carrying Case

Mini-Lite Box--Colored Shape Cards

Mini-Lite Box--Familiar Object Cards

Mini-Lite Box--Pegs and Pegboard

Mini-Lite Box--Plexiglas Blocks

Mini-Lite Box--Plexiglas Spinner & Patterns

Mini-Lite Box--Transparent Overlays

Money-Handling and Budgeting- Large Print Kit

Multiplication and Division Table Kit

Nemeth Code Reference Sheet

PrivatePhones--Stereo Headphones

ProWORDS/ProBRAILLE/ProTERM Kit

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Primary 2

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Primary 3

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Intermediate 1

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Intermediate 2

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Intermediate 3

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Advanced 1

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, Advanced 2

Stanford Achievement Test, Ninth Edition, Print Directions for Administering the Braille, Form S, Complete Battery/Multiple Choice, TASK 1, 2, 3

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, Primary 2

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, Primary 3

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, Intermediate 1

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, Intermediate 2

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, Intermediate 3

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, Advanced 1

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, Advanced 2

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, TASK 1

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, TASK 2

HB Stanford Achievement Test in Braille, Ninth Edition, Form S, Complete Battery/Multiple Choice, TASK 3

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, Primary 2

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, Primary 3

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, Intermediate 1

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, Intermediate 2

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, Intermediate 3

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, Advanced 1

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, Advanced 2

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, TASK 1

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, TASK 2

HB Stanford Achievement Test in Large Type, Ninth Edition, Form S, Complete Battery/Multiple Choice, TASK 3

Stereo to Mono 3.5mm to 1/4" Adaptor Plug

Stereo to Mono 3.5mm to 3.5 mm adaptor Plug

Tactile Treasures Kit

Transition Tote Case, alone

Transition Tote System--Student Kit, Large Type Version

HV42 Am35 D441 1997
REPORT OF RESEARCH AND
DEVELOPMENT ACTIVITIES, FISCAL
YEAR 1997

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REPORT OF RESEARCH AND
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YEAR 1997

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